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COVER TAPE FOR EMBOSSING CARRIER TAPE FOR SURFACE COATING
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[Claims] /2*

[Claim 1] A cover tape for embossing carrier tape for surface coating which is a cover tape which can be heat-sealed onto plastic carrier tape on which is continuously formed a storage pocket used to store chip-type electronic components; the external layer is a biaxially oriented film made either of polyester or polypropylene; the intermediate layer is an ethylene-α olefin copolymer having a tear strength (JIS K 7128) of at least 100 kg/cm, a tensile impact strength (ASTM D 1822) of at least 100 kg-cm/cm^2, an opaqueness (JIS K 7105) of not more than 15 %; and the adhesive layer is a specified coating film which uses a polyurethane group resin, acrylic group resin, polyvinyl chloride resin, ethylene vinyl acetate group resin, polyester group resin, butadiene group resin or styrene resin which can be heat-sealed on a plastic carrier tape or a combination of these; an electrically conductive tin oxide or zinc oxide fine powder is dispersed in the adhesive agent; the amount of electrically conductive fine powder added is 10 to 1000 wt. parts relative to 100 wt. parts of an adhesive agent base; the surface resistance value of the adhesive layer is 10^{13} Ω/□ and under; the adhesive strength of the sealed surface of the adhesive layer of said cover tape and said carrier tape is greater than the interlaminar adhesive strength of the intermediate layer of the cover tape and the adhesive layer and the interlaminar adhesive strength of said cover tape and the

*Claim and paragraph numbers correspond to those in the foreign text.

adhesive layer is 10 to 130 gr per 1 mm of sealing width; the total light permeability of said cover tape is not more than 70 %; and the tensile impact strength is at least 400 kg-cm/cm^2.

[Claim 2] A cover tape for embossing carrier tape for surface coating which is a cover tape which can be heat-sealed on a plastic carrier tape on which is continuously formed a storage pocket used store chip-type electronic components; the external layer is a biaxially oriented film made of polyester or polypropylene; a second layer inside this is an oriented or non-oriented polyester or polypropylene film; an intermediate layer inside this is an ethylene -α olefin copolymer having a tear strength (JIS K 7128) of at least 100 kg/cm, a tensile impact strength (ASTM D 1822) of at least 100 kg-cm/cm^2, an opaqueness (JIS K 7105) of not more than 15 %; the adhesive layer is a specified coating film which contains an adhesive agent made of a polyurethane group resin, an acrylic group resin, a polyvinyl chloride resin, an ethylene vinyl acetate group resin, a polyester group resin, a butadiene resin or a styrene group resin which can be heat-sealed on plastic carrier tape or it may be a combination of these; an electrically conductive tin oxide or zinc oxide fine metal powder is dispersed in the adhesive agent; the amount of electrically conductive fine powder to be added is 10 to 1000 wt. parts relative to 100 wt. parts of the resin-based adhesive agent; the surface resistance value of the adhesive layer is 10^{13} Ω/□ and under; the adhesive strength of the sealed surface of the

intermediate layer of said cover tape and said carrier tape is greater than the interlaminar adhesive strength of the intermediate layer of said cover tape and the adhesive layer and the interlaminar adhesive strength between the intermediate layer of said cover tape and the adhesive layer is 10 to 130 gr per 1 mm of sealing width; the total light permeability of said cover tape is at least 70 %; and the tensile impact strength is at least 400 kg-cm/cm^2.

[Claim 3] A cover tape for embossing carrier tape for surface packaging as described in Claim 1 or Claim 2 wherein the resin in the ethylene-α olefin copolymer in the intermediate layer is polymerized using zirconocene dichloride and minoxane as a catalyst.

[Claim 4] A cover tape for embossing carrier tape for surface packaging as described in Claim 1, Claim 2 or Claim 3 wherein the density of the resin in the ethylene-α-olefin copolymer is 0.900 to 0.925 g/cm^3; the melting point is 110°C and under; and the ratio (multi-dispersive power) of the molecular weight prescribed by the ratio of the weight-average molecular weight (Mw) to number average molecular weight (Mn) is 3 and under.

[Detailed Description of Invention]

[0001] [Industrial Background]

The present invention relates to a cover tape to be heat-sealed on a plastic embossing carrier tape having a storage pocket formed, wherein chip type surface packaging electronic components are protected from contamination when the chip-type electronic components

are stored, transported and mounted; these are oriented for packaging on the electronic circuit substrate in the packages which have a removing function.

[0002] [Description of the Prior Art]

In recent years, memories, logic and other types of ICs and transistors, diode, capacitors and other surface packaging chip-type electronic components are fitted to the shape of the electronic component and the embossed carrier tape which can be accommodated is supplied by continuously packing in a packing body comprised of a cover tape heat-sealed on a molded plastic embossing carrier tape and said cover tape which can be heat-sealed. After the cover tape of said packaging body is peeled, the electronic component with the content is removed automatically and surface packaged on an electronic circuit substrate. Packaging technology is becoming increasingly sophisticated and increasingly precise and efforts are being made to increase the production efficiency. As a result, the packaging speed for electronic components is rapidly accelerating. Facilities are being remodeled to tightly wind the cover tape so that it can be removed without the cover tape being peeled off incorrectly when the cover tape is peeled during packaging and the electronic components are removed. In addition, it is rapidly accelerating so that the packaging tact is 0.1 seconds or less/tact. Now the current practice is to have a mechanism wherein the cover tape is peeled instantly at 0.1 seconds or less. As a result, the cover tape is

peeled away instantly at an extremely strong force and is subjected to a huge shock which is greater than that in the prior art.

[0003] Amidst this, the cover tape is not able to withstand the stress when peeled and there has recently been a great deal of trouble with so-called "tape breaking" in which the cover tape breaks. In the prior art, the packaging speed is too slow which has been somewhat troublesome. The only countermeasure used thus far has been to make the outside layer, which has a strong mechanical strength, thicker. Virtually the only cover tape currently on the /3
market has a simple structure consisting of two layers, a base layer and a sealant layer. However, since the characteristics of the sealant having maximum priority are the low-temperature sealing characteristics with the carrier tape, a resin which is comparatively pliable and which has low heat resistance and mechanical strength is selected. Resins with excellent tear strength and shock resistance as a sealant such as LLDEPE and VLDPE and other low-density olefins are used, however, the molecular weight and the composition distribution is made. In low molecular weight areas, the foul odor of the film and the stickiness are hindrances and in high molecular weight areas, the heat sealant characteristics are an obstacle and it has poor opacity so that we have had to relay virtually only on the mechanical strength of the outer layer for resistance to tape tearing. However, when the outer layer is too thick, the sealing characteristics at low temperatures are poor and there are limits to the countermeasures

which can be used merely by relying on the thickness of the outer layer of a simple layer. When extremely strong sealing is carried out and notches are made, the tape breaks and the countermeasures made are not suitable.

[0004] [Problems which the Present Invention is to Solve]

The present invention solves the abovementioned problems and provides a cover tape which is heat-sealed on a plastic embossing carrier tape which completely prevents breaking of the tape when the cover tape is peeled off during packaging and at the same time has excellent mechanical strength which does not adversely affect the low-temperature sealing characteristics or the opacity.

[0005] [Means Used to Solve the Problems]

The present invention was completed after it was found that a cover tape could be obtained having a complex film with good characteristics by using a biaxially oriented film as an external layer; an intermediate layer inside this was made of an ethylene-α olefin copolymer polymerized by using a metallocene catalyst having excellent tear strength, shock resistance and transparency; and an adhesive layer made by coating a heat-sealing type thermoplastic adhesive agent in which is dispersed an electrically conductive fine powder, having a surface resistance value of not more than 10^{13} and a total light permeability of at least 70 %. It may also be a complex film comprised of an external layer which is a biaxially oriented film; an intermediate layer, inside this, which has excellent shock

resistance which contains an ethylene-α olefin copolymer polymerized using a metallocene catalyst having excellent tear strength, shock resistance and transparency; and an adhesive layer coated with a heat sealing lacquer type thermoplastic adhesive agent in which an electrically conductive fine powder is dispersed; having a surface resistance value on the adhesive layer of not more than 10^{13} and a total light permeability of at least 70 %.

[0006] This means that the present invention is a cover tape which can be heat-sealed on a plastic carrier tape on which a storage pocket accommodating chip-type electronic components is continuously formed. Said cover tape has an external layer which is a biaxially oriented film. The intermediate layer thereof contains ethylene-α-olefin copolymers having a tear strength (JIS K 7128) of at least 100 mg/cm; a tensile impact strength (ASTM D 1822) of not more than 100 $kg\text{-}cm/cm^2$; an opaqueness (JIS K 7105) of not more than 15 %; a resin density of 0.900 to 0.925 g/cm^3; a melting point of not more than 110°C; and a molecular weight ratio prescribed by the ratio of the weight - average molecular weight (Mw) to the number-average molecular weight (Mn) — of not more than 3. The adhesive layer thereof may be a polyurethane group resin, an acrylic group resin, a polyvinyl chloride group resin, an ethylene vinyl acetate group resin, a polyester group resin, a butadiene group resin or a styrene group resin which can be heat-sealed on a plastic carrier tape or it may be a combination of these. An electrically conductive tin oxide

or zinc oxide fine powder is dispersed in the adhesive agent. The amount of electrically conductive fine powder is 10 to 1000 wt parts relative to 100 wt parts of the adhesive agent base resin. The surface resistance value for the adhesive layer is 10^{13} Ω/□. The adhesive strength between the adhesive layer of said cover tape and said carrier tape sealed surface is greater than the interlaminar adhesive strength between the intermediate layer of said cover tape and the adhesive layer. The interlaminar adhesive strength between the intermediate layer of said cover tape and the adhesive layer is 10 to 130 gr per 1 mm of sealing width. The total light permeability of said cover tape is at least 70 %; the tensile impact strength is at least 400 kg-cm/cm^3. It is a surface packaging embossing carrier cover tape or biaxially oriented film having an external layer which is made of polyester or polypropylene. The second layer inside this is a polypropylene or nylon biaxially oriented or non-oriented layer. The intermediate layer inside this contains ethylene-α olefin copolymers polymerized by a metallocene catalyst having a tear strength (JIS K 7128) of at least 100 kg/cm; a tensile impact strength (ASTM D 1822) of at least 100 kg-cm/cm^2; an opaqueness (JIS K 7105) of not more than 15 %; a resin density of 0.900 to 0.925 g/cm^3; a melting point of not more than 110°C ; the ratio of the molecular weight prescribed by the ratio of the weight-average molecular weight (Mw) to the number-average molecular weight (Mn) is not more than 3. The adhesive layer contains an adhesive agent composed of a

polyurethane group resin, an acrylic group resin, a polyvinyl chloride group resin, an ethylene vinyl acetate group resin, a polyester group resin, a butadiene group resin or a styrene group resin which can be heat-sealed on the plastic carrier tape or it may be a combination of these. An electrically conductive fine powder made either or tin oxide or zinc oxide is dispersed in the adhesive agent. The amount of conductive fine powder added should be 10 to 100 wt parts relative to 100 wt parts of the base resin in the adhesive agent. The surface resistance value of the adhesive layer is not more than 10^{13} $\Omega/\square$. The adhesive strength between the adhesive layer of said cover tape and the sealed surface of the carrier tape is greater than the interlaminar adhesive strength of the intermediate layer of said cover tape and the adhesive agent, and the interlaminar adhesive strength between the intermediate layer of said cover tape and the adhesive layer is 10 to 130 gr per 1 mm of said cover tape width. The total light permeability (JIS K 7105) of the cover tape is at least 70 %. The tensile impact strength is at least 400 kg-cm/cm^2. The resin in the ethylene-α olefin copolymer of the intermediate layer in either of the configurations is polymerized using as zirconocene dichloride and methyl aluminoxane as a catalyst.

[0007] [Operation of the Invention] /4

The constituent elements of the cover tape 1 in the present invention are indicated in Figure 1 or Figure 2. In Figure 1, external layer 2 is a biaxially oriented made either of biaxially

oriented polyester film or biaxially oriented polypropylene film. It consists of an ethylene-α-olefin copolymer polymerized using a metallocene catalyst. It is a rigid film which is 6 to 25 μm thick, has excellent permeability and outstanding heat resistance. When the external layer is less than 6 μm, it loses its rigidity. When it exceeds 25 μm, it is too hard and the sealing is unstable. The intermediate layer 4 has a tear strength (JIS K 7128) of at least 100 kg/cm; a tensile impact strength (ASTM D 1822) of at least 100 kg-cm/cm^2; an opaqueness (JIS K 7105) of not more than 15 %; a resin density of 0.900 to 0.925 g/cm^3; a melting point of not more than 110°C; the ratio (multi-dispersive power) of the molecular weight prescribed by the ratio of the weight-average molecular weight (Mw) to the number-average molecular weight (Mn) is not more than 3. When the tear strength is less than 100 kg/cm and the tensile impact strength is less than 100 kg-cm/cm, it is possible that it cannot sufficiently handle the impact when high-speed peeling is carried out and the tape will tear. In addition, when the opaqueness exceeds 15 %, the permeability of the overall cover tape greatly declines and the visibility of the device declines. When the density of the ethylene-α olefin copolymer in the resin in the intermediate layer is less than 0.900 g/cm^3, it becomes difficult to work with the film. When it exceeds 0.930, the low-temperature sealing characteristics deteriorate. In addition, when the multi-dispersive power is 3 or more, dispersions in the sealing characteristics increase, the film

becomes sticky, it has a foul odor and the transparency declines, thereby making it impossible to obtain good characteristics. In this case, the resin is used optimally by using a so-called metallocene catalyst which should be polymerized using zirconocene dichloride and methyl aluminoxane as a catalyst.

[0008] The metallocene catalyst is a so-called single site catalyst whose active site is homogeneous and is differentiated from prior-art multi-site catalysts such as the Ziegler-Natta catalyst. When multi-site catalysts are used, the molecular weight distribution which has a variety of different active sites is wide and the amount of comonomer contained is different. As a result, the low-temperature heat-sealing characteristics and transparency characteristics are adversely affected over a wide distribution. For example, it is possible that LLDPE can be provided with tear strength resistance and tensile impact resistance using LDPE. Meanwhile, the active site of a single site catalyst is uniform so that the molecular weight distribution is narrow. The amount of comonomers in each molecule is virtually identical so that it can have good low-temperature heat-sealing characteristics and transparency. The side which makes contact with intermediate layer 4 and external layer 2 may be subjected to corona processing, plasma processing, sandblasting and other types of surface processing, thereby improving the adhesiveness, and pasting can be carried out by dry lamination and extrusion lamination. The intermediate layer should have a film

thickness of at least 10 μm and preferably 20 to 60 μm. When it is thinner than 10 μm, there is no tear resistance. When it is thicker than 60 μm, the heat-sealing characteristics are adversely affected. Adhesive layer 5 has characteristics which make it possible to carry out heat-sealing on a plastic carrier tape of a matching material using heat-sealing lacquer type thermoplastic adhesive agent monomers or a combination of these made of any of a polyurethane group resin, an acrylic group resin, an ethylene vinyl acetate group resin, polyvinyl chloride group resin, polyester group, butadiene group resin or styrene group resins.

[0009] Electrically conductive tin oxide or zinc oxide fine powders are dispersed uniformly in the adhesive agent. At that time, the surface resistance value for the adhesive layer following film formation should be at least 10^{13} Ω/□ and under and preferably within the range of 10^{6} Ω/□ to 10^{10} Ω/□. When the value is greater than 10^{13} Ω/□, the electrostatic effect deteriorates to an extreme and the desired performance cannot be obtained. In addition, the amount added should be 10 to 1000 wt parts and preferably 100 to 300 wt parts relative to 100 wt parts of the adhesive agent base resin due to the abovementioned surface resistance characteristics. When the amount added is less than 10 wt parts, the electrostatic prevention effect does not manifest. When more than 100 wt parts are added, the dispersibility to the adhesive agent deteriorates conspicuously and is not suitable for production. In addition, the electrostatic

processing material itself was itself electrically conductive so that the electrostatic effect was semi-eternal. Since no bleeding was caused, the sealing characteristics were not affected. The surface resistance value on the adhesive layer is adjusted to 10^{13} Ω/□ and under. As a result, even if the electronic components make contact with said cover tape while being transported while the electronic components are sealed to the carrier tape using the cover tape or even if the cover tape is peeled and the electronic components are being picked up, no static electricity is generated and the electronic components can be protected from an antistatic obstruction. Furthermore, the electrostatic effect is increased so that an antistatic processing layer or conductive layer may be disposed on the front and back surfaces of the external layer, that is, a biaxially oriented film to increase the electrostatic effect. In addition, either the fusion coat manufacturing method or the solution film manufacturing method may be used to make the heat-sealing type adhesive agent and the solution film manufacturing method is desirable from the vantage point of the dispersibility of the electrically conductive fine powders.

[0010] In addition, during the cover tape sealing peeling process, first of all, said cover tape 1 is sealed continuously to form a reel shape having a width of approximately 1 mm on both sides, each side having a width of approximately 1 mm (Figure 3). Next, when said cover tape 1 is peeled away from said carrier tape 6 during

peeling, when the adhesive strength between the adhesive layer 5 of said cover tape 1 and the sealed surface of said carrier tape 6 is less than the interlaminar adhesive strength of intermediate layer 4 of said cover tape 5 and the adhesive layer 5, the peel off strength corresponds to the adhesive strength of the sealed surface of adhesive layer 5 of said cover tape 1 and said carrier tape 6 and peeling is carried out by surface peeling which is the peeling mechanism most often used at present. Meanwhile, when the adhesive strength of the sealing surfaces of adhesive layer 5 of said cover tape 1 and said carrier tape 6 is greater than the interlaminar adhesive strength of intermediate layer 4 of said cover tape 1 and adhesive layer 5, only the part sealed on adhesive layer 5 which has been formed remains on the carrier tape (Figure 4). After it has been peeled off, the cover tape (Figure 5) is peeled by so-called transfer peeling in which only the part of adhesive layer 5 which has been heat-sealed falls off. This means that the peel off strength corresponds to the interlaminar adhesive strength between adhesive layer 5 and intermediate layer 4. The peeled surface is designed so that it is inside the cover tape and the interlaminar adhesive /5 strength thereof can be set independently of the material used for the carrier tape. As a result, the sealing state of said cover tape and said carrier tape is not affected and a stable peel off strength can be obtained. In this case, an adhesive agent should be selected such that the interlaminar strength between the intermediate layer of

said cover tape and the adhesive layer is 10 to 130 gr per 1 mm of sealing width and preferably 10 to 70 gr. When the peeling strength is less than 10 gr, there are problems in that the cover tape comes off when the packaged object is moved and the electronic components which are the contents fall out of place. Conversely, when the peeling strength is greater than 130 gr, the carrier tape shakes when the cover tape is peeled off and comes out of the storage pocket right before the electronic components are packaged, that is, "jumping trouble" occurs. Thanks to this transfer peeling mechanism, the dependence on the sealing conditions is lower than when interfacial peeling occurred in the prior art and the desired objective of fewer changes over time in the peeling strength caused by the storage environment can be obtained. In addition, since the configuration makes it possible for an overall cover tape light permeability of at least 80 %, the electronic components inside which are sealed by the carrier tape can be confirmed visually or mechanically. When the peeling strength is less than 70 %, it is difficult to confirm the electronic components inside.

[0011] Next, Figure 2 indicates an oriented or non-oriented polypropylene and nylon film as external layer 2 and second layer 3 inside it. The film is 6 to 50 μm thick, transparent and has excellent shock resistance and tear strength. Said layer 3 is less than 6 μm thick and the tear resistance is insufficient. When it is more than 50 μm thick, the sealing characteristics are unstable.

Incidentally, there are biaxially oriented nylon films which have excellent transparency as well as heat resistance, tear resistance and shock resistance. However, the slipping characteristics of the external layer vis-à-vis the heat sealing iron are poor and it is particularly unsuitable for sliding-type sealing machines. In addition, since the hygroscopic properties are great, blocking problems occur on the external layer so that it is not suitable for an external layer. The side which makes contact with external layer 2 and external layer 3 can be subjected as needed to corona processing, plasma processing, sandblasting and other types of surface processing, thereby improving the adhesiveness and making possible pasting operations using extrusion lamination and dry lamination. In addition, intermediate layer 4 and adhesive layer 5 have the same structures as in Figure 1.

[0012] [Practical Embodiment of Invention]

Practical embodiments of the present invention are indicated as follows, however, it should by no means be construed that the present invention is restricted to these.

(Practical Embodiments 1 through 7 and Comparative Embodiments 1 through 5) Table 1 and Table 2 indicate a biaxially oriented film laminated on the external layer and an intermediate layer laminated inside that as well as an oriented or non-oriented film laminated between the external layer and the intermediate layer having excellent tear strength and shock resistance. We manufactured a

solution coating adhesive layer which was 2 μm thick using a roll coater between the external layer and the intermediate layer or on the side opposite the side making contact with the layer having excellent shock resistance. Furthermore, the density of the resin on the intermediate layer as well a melting point, film tear strength, tensile impact strength and opaqueness are indicated in Table 1 and Table 2. Type of conductive fine powder and the amount added are indicated in parentheses after the adhesive layer. The amount added is the amount (wt part) relative to 100 wt part of the thermoplastic resin on the adhesive layer. After making a slit in the test piece having a width of 13.5 mm, we carried out heat sealing on a styrene carrier tape having a width of 6 mm. We determined whether or not there was any tape cut using a high-speed peeler (42000 mm/min) and measured the peeling strength (measuring speed: 300 mm/min). In addition, we measured the surface resistance value on the adhesive layer side as well as the visible light permeability and the tensile impact strength of the cover tape test product. Results are indicated in Table 3 and Table 4.

Heat sealing conditions: 120°C/1 kg/cm^2/ 1 sec, sliding type sealing, sealing width: 1 mm x 2.

Heat sealing conditions: 180°C peeling, peeling speed of 300 mm/min, number of test pieces: 3

[0013] Furthermore, the raw materials used are as follows:

- PE: polyethylene using metallocene catalyst for polymerization
- PET : polyethylene terephthalate (non-oriented)
- O-PET : biaxially oriented polyethylene terephthalate
- PP: polypropylene (non-oriented)
- OPP : biaxially oriented polypropylene
- NY : nylon (non-oriented)
- ONY : biaxially oriented nylon
- EVA : ethylene vinyl acetate copolymer
- PVC : polyvinyl chloride
- LDPE: low-density polyethylene
- LLDPE: straight-chain low-density polyethylene
- SnO_2 : tin oxide
- ZnO_2 : zinc oxide

[0014] Table 1

	Practical Embodiments					
	1	2	3	4	5	6
· external layer Resin used Thickness (μm)	O-PET 25	O-PET 12	O-PET 9	OPP 16	O-PET 12	OPP 25
· second layer Resin used Thickness (μm) · intermediate layer	-	ONY 12	PP 15	NY 15	OPP 15	-
Total light permeability (%)	88.0	85.2	76.3	50.7	25.8	81.0

Resin used	PE	PE	PE	PE	PE	PE
Thickness (μm)	20	30	50	15	40	30
Density (g/cm^3	0.905	0.905	0.910	0.920	0.915	0.905
Melting point (℃)	90	88	100	105	103	93
Tear strength (kg/cm)	124	145	120	110	130	145
Tensile impact strength ($kg/cm/cm^2$)	120	125	110	105	107	112
Opaqueness · adhesive layer	8	7	13	12	13	10
Adhesive agent used	PVC group	Acrylic group	PET group	Polyurethane group	EVA group	Butadiene group
Conductive fine powder	SnO_2	SnO_2	ZnO_2	ZnO_2	SnO_2	SnO_2
(wt parts)	150	250	320	600	900	200

[0015] Table 2

	Practical Embodiment	Comparative Embodiment				
	7	1	2	3	4	5
· external layer Resin used	O-PET	O-PET	OPP	O-PET	OPP	O-PET
Thickness (μm)	16	25	25	16	25	16
· Second layer Resin used	ONY	-	-	OPP	--	ONY
Thickness (μm)	12			15		12
· intermediate layer Resin used	PE	LLDPE	-	5 % EVA	LLDPE	LDPE
Thickness (μm)	40	30		30	20	40
Density (g/cm^3)	0.910	0.908		0.933	0.915	0.919
Melting point (℃)	102	120		125	125	128
Tear strength (kg/cm)	124	85		45	105	60
Tensile impact strength (kg-cm/cm^2)	120	75		35	100	45
Opaqueness (%)	11	20		13	18	8
· adhesive layer Resin used	Styrene group	PET group	Polyurethane group	EVA group	Acrylic group	EVA group
Conductive fine powder	SnO_2	ZnO_2	SnO_2	SnO_2	Surface-active agent	SnO_2
(wt parts)	400	150	7	1200	2	1500

[0016] Table 3

	Practical Embodiment					
	1	2	3	4	5	6
High-speed peeling test tape tearing	none	none	none	none	none	None
Peeling strength Initial value 40°C-90%, 30 days, 60°C, 30 days	40 55 68	45 45 50	30 28 55	25 62 75	43 38 80	52 55 68
Interlaminar Peeling method	transfer	transfer	transfer	transfer	Transfer	Transfer
Tensile impact strength (kg-cm/cm^2)	420	505	350	220	430	450
Surface resistance value (Ω/□)	10^9	10^8	10^6	10^7	10^5	10
Total light permeability	88.0	85.2	76.3	50.7	25.8	81.0

/7

[0017] Table 4

	Practical Embodiment	Comparative Embodiments				
	7	1	2	3	4	5
High-speed peeling test tape break	none	none	none	none	none	none
Peeling strength Initial value 40°C-90%, 30 days 60°C, 30 days	25 30 45	10 5 48	45 15 150	5 0 10	35 5 25	11 2 15
Peeling method for adhesive layer	transfer	transfer	transfer	transfer	transfer	Transfer
Tensile impact strength (kg-cm/cm^2)	505	350	220	430	280	550
Surface resistance value (Ω/□)	10^7	10^{12}	10^{14}	10^4	10^4	10^4
Total light permeability (%)	74.3	72.6	89.5	45.6	88.0	30.5

[0018] [Effect of Invention]

The present invention solves the problems associated with the prior art, namely, the problem of tape tearing during peeling, the

problem of great dependence of the peel off strength on the sealing conditions, the problem of changes over time in the storage environment, the problem of contact between the electronic components and the cover tape as well as the problem of static electricity occurring when the cover tape was peeled due to the following five points: there is no chance that tape will tear even if the high-speed operations of the packaging apparatus are accelerated; the adhesive layer is electrostatically processed, static electricity generated when the cover tape is peeled is held in check and the sealing characteristics are not affected; thanks to the fact that the heat sealing lacquer adhesive agent and the intermediate layer are combined, low-temperature sealing can be carried out and the peel off strength can be set at will within the range of 10 to 120 gr; the peel off strength is determined by the interlaminar adhesive strength inside the cover tape so that it is not affected by the sealing conditions with the carrier tape; and the invention ensures good transparency and the devices contained therein can be easily inspected, thereby providing a stable peel off strength.

[Brief Explanation of Figures]

[Figure 1] A sectional view of the interlaminar configuration of the cover tape in the present invention.

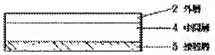
[Figure 2] A sectional view of the interlaminar configuration of the cover tape in the present invention.

[Figure 3] A sectional view indicating the cover tape in the present invention when it adheres to the carrier tape.

[Figure 4] A sectional view of the cover tape in the present invention indicating peeling from the carrier tape.

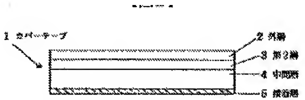
[Figure 5] A sectional view of the carrier tape when the cover tape in the present invention is peeled.

[Figure 1]



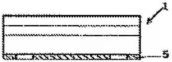
Key: (2) external layer; (4) intermediate layer; (5) adhesive layer

[Figure 2]

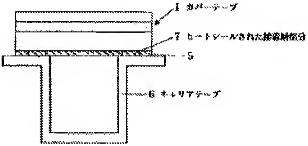


Key: (1) cover tape; (2) external layer; (3) second layer; (4) intermediate layer; (5) adhesive layer

[Figure 4]



[Figure 3]



Key: (1) cover tape; (7) heat-sealed adhesive layer part; (6) carrier tape

[Figure 5]